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REMARKS

Claims 12-25 are now pending in the application. Claims 12, 13, 16, 17 and 19-21 have been amended herein. Claims 23-25 have been added. Favorable reconsideration of the application, as amended, is respectfully requested.

I. NOTICE OF NEW CORRESPONDENCE ADDRESS

Applicant notes that a Power of Attorney/Revocation of Prior Powers was previously submitted in connection with this application and received by the USPTO on June 9, 2003. Applicant respectfully requests that the Examiner take whatever steps are necessary to ensure that future communications from the USPTO are mailed to the undersigned at the address provided below (consistent with the Power of Attorney/Revocation of Prior Powers).

II. OBJECTION TO THE DRAWINGS

Fig. 5 of the drawings is objected to as failing to include a legend such as --Prior Art--. In response, Fig. 5 has been amended herein to include the legend --Related Art-. Withdrawal of the objection is respectfully requested.

Furthermore, applicant notes that Fig. 5 in the present application was inadvertently referred to as prior art on pages 7 and 11. In fact, Fig. 5 is not known to constitute prior art under 35 USC §102. Therefore, the application has been amended to refer to Fig. 5 simply as related art.

III. REJECTION OF CLAIMS 12-22 UNDER 35 USC §112, 2ND ¶

Claims 12-22 stand rejected under 35 USC §112, second paragraph, as being indefinite. Withdrawal of the rejection is respectfully requested for at least the following reasons.

Regarding claim 12, the Examiner indicates there is insufficient antecedent basis for "said front facet". In response, claim 12 has been amended to refer to "said laser's front facet". Thus, it is clear that the laser has a front facet so as to provide antecedent basis.

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Regarding claims 13 and 21, the phrase "preferably" has been stricken only for the purpose of eliminating any indefiniteness in the claim.

Regarding claim 16, the claim has been amended to make clear that the reflectors being referred to are those referred to in claim 12. As noted in amended claim 12, one of the reflectors is located in the laser beam guide means. As stated in amended claim 16, the reflector located in the laser beam guide means is a Bragg grating. The other reflector is now expressly defined in new claim 23 as the laser's front facet.

As for claim 17, the claim has been split up: Amended claim 17, dependent on claim 12, now refers only to the reflectors. New claim 24, dependent on claim 15, refers to the beam splitter/combiner.

Regarding claim 19, this claim was also split up: The "especially" clause in claim 19 was removed and is now the subject of added claim 25. Also, the second "and/or" was changed to "and" as proposed by the Examiner and an "a" inserted before the fiber to indicate that a reflector may also be located in another fiber than the above-defined one, see Fig. 4 for example.

Claim 20 was amended to refer now to "an optical fiber", thus providing proper antecedent basis.

Claim 21 was amended to refer to "a plurality of external cavities" which should provide sufficient antecedent basis.

Claim 23 was added to define one possibility of providing "the other" reflector, as already addressed in claim 21.

In view of the above changes made for clarification purposes only, withdrawal of the rejection is respectfully requested.

IV. REJECTION OF CLAIMS 12-13, 17-19 AND 21 UNDER 35 USC §102(b)

Claims 12-13, 17-19 and 21 stand rejected under 35 USC §102(b) based on *Ventrudo et al.* Withdrawal of the rejection is respectfully requested for at least the following reasons.

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Claim 12 refers to a laser source which includes a plurality of external cavities. In the context of the present application, an "external cavity" refers to a significant cavity outside the laser defined by intentionally arranged reflectors, i.e. an outside cavity which affects or determines the laser's function, contrary to the "laser cavity" which defines the cavity between the laser's facets.

As is apparent to the person skilled in the art, there are practically always other undesired, mostly detrimental, cavities, produced by any reflecting elements in the laser's beam path. Such "undesired cavities" depend, of course, on the reflectivity of the devices in the beam path, but are often unavoidable. For the purpose of the present application, these undesired cavities are insignificant and thus neglected. The same applies when reading through the applicable prior art where these undesired cavities are similarly neglected.

Such interpretation of "external cavity" is clearly readable from the specification and the drawings of the present application. It is likewise readable from the prior art cited in the present application, e.g. Ventrudo et al. USP 5 715 263. (See, e.g., Spec., p. 3, Ins. 1-12).

The present invention is concerned with overcoming the problems of wavelength and power stabilisation of a semiconductor laser diode (a laser in brief) and with the mode switching that occurs with prior art designs. Essentially, this is achieved by using two or more appropriately arranged external cavities as recited in claim 12.

Ventrudo et al. USP 5 485 481

Ventrudo '481 is closely related to Ventrudo et al. USP 5 715 263 cited in the present application, actually Ventrudo '263 is a divisional of the above. The parent Ventrudo '481 does not appear to disclose any additional features over the Divisional '263 cited in the present application.

Ventrudo '481 shows a single Bragg grating to form an external cavity between the laser's front facet and said grating.

Fig. 2 of Ventrudo '481 illustrates this. The front and rear facet of the diode laser form the "laser cavity", see col. 4, line 24. The front facet of the diode laser and the

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fibre Bragg grating (FBG) form the "external cavity", as can be understood from col. 4, line 38 et seq.

As usual, the end of the fibre shown in Ventrudo '481 has an antireflection coating to provide a very low reflectivity. This coating certainly does not serve as a reflector in defining any desired cavities. In other words, any cavity produced by this antireflection coating is an insignificant, undesired cavity and thus ignored.

There are even more undesired cavities in the beam path shown by Ventrudo *et al.*, e.g. between the laser's front facet and the lens or between the lens and the antireflection coating of the fiber, but the specification is silent on these reflectors because they do not play any functional role. (It would certainly be preferable not to have these undesired cavities, but they are probably unavoidable.)

The present invention improves upon a design as shown by Ventrudo *et al.* USP 5 715 263 by providing "a plurality of external cavities". Claim 12 of the present application clearly identifies a plurality of external cavities, each being established by two reflectors. Fig. 1 of the present application illustrates such a device with two cavities. The first cavity is 5a, formed between the diode laser front facet 2 and the first grating 6a. The second cavity 6b is formed between the first grating 6a and the second grating 6b. This arrangement is also subject of claim 21.

Such a structure is not disclosed by Ventrudo *et al.* USP 5 485 481 which only addresses the use of single external cavity.

Thus it is respectfully submitted that Ventrudo *et al.* USP 5 485 481 neither anticipates nor obviates the present invention as claimed.

V. REJECTION OF CLAIMS 12-13 AND 15-18 UNDER 35 USC §102(b)

Claims 12-13 and 15-18 stand rejected under 35 USC §102(b) based on Fye. Withdrawal of the rejection is respectfully requested for at least the following reasons.

Fye concerns the generation of two stable laser beams for using in a beats signal generation technique. It provides two very narrow reflection peaks (single modes) from two diffraction gratings, which are mechanically tilted for tuning, in order to create a microwave frequency beats signal.

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In contrast to that, and as obvious to a person skilled in the art, is the present invention using peaks that are wide enough to contain several modes, for multimode operation, and it operates in coherence collapse mode. Thus, despite the apparent "mechanical" similarity, the operation of the present invention is very different from the arrangement disclosed by *Fye*.

Further, *Fye* discloses an arrangement wherein at least some of the optical elements, specifically at least one of the gratings 16 and 17 shown in Figs. 1 and 3, must be mechanically adjustable, see col. 3, lines 19-20: they are tiltable to adjust the frequency. This is necessary for the function of the *Fye* arrangement.

The present invention - because of its very different function - does not need such an adjustment possibility. Consequently, it does not provide such an adjustability - the optical system according to the present invention is fixed.

To clarify this and to distinguish further the present invention better from the cited *Fye*, claims 12 and 21 of the present application have been amended to define the reflectors establishing the external cavities as being fixed, i.e. non-adjustable. *Fye* neither teaches nor suggests such configuration.

VI. REJECTION OF CLAIMS 14, 16, 20 AND 22 UNDER 35 USC §103(a)

Claims 14, 16, 20 and 22 stand rejected under 35 USC §102(b) based on *Ventrudo et al.*. Withdrawal of the rejection is respectfully requested for at least the following reasons.

As described in detail above, *Ventrudo et al.* shows a single Bragg grating to form an external cavity between the laser's front facet and said grating. There is no indication, reference, or mentioning in *Ventrudo et al.* that a plurality of external cavities may be used. There is also nothing said or indicated about placing the single external cavity disclosed somewhere else than at the front end of the laser. Consequently the provision of a plurality of cavities and the placement of one of these cavities at the laser's rear end, as claimed in claim 14 are considered both novel and inventive with regard to *Ventrudo et al.*.

It is conceded that the use of Bragg gratings as reflectors for providing a laser

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cavity and the formation of these Bragg gratings by UV exposure of appropriately conditioned material is known to a person skilled in the art. However it is considered novel and inventive to provide Bragg gratings and/or form them by UV exposure in a laser source according to amended claim 12.

It is equally conceded that the use of a lens for directing a laser beam into a fiber is a known method, but since the respective claim 20 is a dependent claim and thus includes all limitations of independent claim 12, claim 20 is also considered novel and inventive over the cited prior art.

VII. REJECTION OF CLAIMS 14 AND 19 UNDER 35 USC §103(a)

Claims 14 and 19 stand rejected under 35 USC §102(b) based on *Fye*. Withdrawal of the rejection is respectfully requested for at least the following reasons.

As shown above, *Fye* does neither anticipate nor obviate the invention as defined by the independent claims as amended. Thus the dependent claims should be allowable.

VIII. CONCLUSION

Accordingly, all claims 12-25 are believed to be allowable and the application is believed to be in condition for allowance. A prompt action to such end is earnestly solicited.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

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Should a petition for an extension of time be necessary for the timely reply to the outstanding Office Action (or if such a petition has been made and an additional extension is necessary), petition is hereby made and the Commissioner is authorized to charge any fees (including additional claim fees) to Deposit Account No. 18-0988.

Respectfully submitted,

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